

EASTERN SCHOOL DISTRICT

Course Descriptor Summary

(Interim September 2005)

SUBJECT AREA: Technology Education

COURSE: Communications Technology 3104

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1. GENERAL OVERVIEW

This course is a 60 hour/1-credit (typically one semester) course. It requires Communications Technology 2104 as a pre-requisite. Students are expected to develop a high level of understanding of communications concepts. A high level of technical excellence is expected from all students and should be evidenced in the products and projects completed. The course is designed to develop students' understanding of the technological problem-solving method, of the nature of communications as a technological process and the way in which tools can be employed to develop practical solutions. The course presents a number of real-time constraints and efficiency and dedication to task are essential. The course consists of six (6) units, including a total of 14 learner outcomes, and activities are designed for each outcome.

Core Units	Weighting	Contact Hours
Unit 1. Introduction	5	3
Unit 2. Graphics Production	22	13
Unit 3. Video	22	13
Unit 4. Multi-media	22	13
Unit 5. Automated Production	22	13
Unit 6. Transportation	7	5
TOTAL	100.00%	60

Units 1 and 6 are to be taught to the whole class in a classroom setting and completed at a later time, or on the student's own time. The remaining units are designed to be managed in a multi-activity module format, in groups of 2 to 3 students. A theme which will be developed throughout the course is the career opportunities available through the development and use of communications technologies and the skills to use them.

2. PARTICIPANTS - RECOMMENDED:

This course is designed to challenge students in developing knowledge and skills in Information and Communications Technologies (ICT), at a higher order of performance than its pre-requisite. Students are expected to use a number of very different technologies and work with a wide range of tools. Although Technology Education courses are no longer required curriculum in NL high schools, knowledge of this area is a highly desirable asset for students graduating into the work force or post-secondary education and training. Familiarity with the use and capabilities of technology is now widely considered as the third essential asset for every student, along with literacy and mathematics. Students enjoy these communications technology courses as they are interesting, challenging, hands-on, activity-based and offer outlets for creativity. The content is quite current and the skills developed are very useful.

3. COURSE CONTENT - CORE UNITS:

UNIT 1. Introduction to Communications Technology

Unit 1 serves as a review for students who have completed Communications Technology 2104 and an essential introduction of basic concepts to those who have not completed this course. It will review the nature of communications and communications technologies and to explore the effects of these technologies on individuals, the workplace and society. Concepts to be reviewed in this unit include: an appreciation of the historical development of communications technologies, identifying and explaining the applications and importance of ICT in today's world; technological assessment; issues relating to political, social, economic, environmental cultural and ethical aspects; foundations and the communications model; importance of publishing, and the impact of technology as it relates to the issues listed above.

UNIT 2. Graphics production technologies

Unit 2 uses the same basic concepts of graphics development and production as in the Graphics Unit of Comm. Tech. 2104, however, there is an expectation that students will develop more sophisticated products and employ the processes in a more complex manner. Graphics productions should be multi page, employ a variety of graphic image generation methods, and exhibit a higher degree of creativity, artistry, and technical competency than in CT 2104.

Every production should use original graphic images produced by students as well as any 'canned' clip art or graphics. For example, images from graphic arts and vide capture or other sources could be used. They will be incorporated into more challenging projects requiring considerable production design and teamwork. Higher order performance might include:

- demonstration of a range of imaging, storage and transmission technologies to others in the class)
- creating a promotional graphic product for the outside of a product box
- creating a perspective rendering of a printer, monitor or any graphics tool
- develop a technical illustration of a product or object using CAD or graphics software

UNIT 3. Video

This video unit covers topics on video formats (NTSC, PAL, Computer analog) It explores various video media including videotape, digital video; video editing and involves the theory and

practical skills of video camera work to editing and final production. The first of two curriculum outcomes in this unit involve comparing and contrasting two video technologies or actually videotaping and editing a final product from the raw footage. The second requires students to create a video production from storyboard to finished video on an approved theme, or producing a broadcast of a school or community event, for a community channel.

UNIT 4. Multimedia Technologies

Media includes print, radio, television, tape and digital audio, animation, graphic arts, film, magazines, books and any other communications tools. Combining two or more of these media qualifies it as multi-media. There is a convergence of film, movie and computer media to provide news, entertainment, information, shopping and other commercial options, communication, etc. The multimedia unit of this course requires the student to become knowledgeable about the nature and use of interactive multimedia technologies by describing 10 recent multi-media technologies or demonstrating one of these in a 2-3 minute media presentation. The second curriculum outcome requires students to create a unique multimedia production, using video, audio and text or animation elements.

UNIT 5. Communication for Automated Production

Unit 5 includes an exploration of the field of automated systems. Automated systems may be found in such facilities as seafood processing, manufacturing of clothes, furniture, vehicles or guitars, medical or research institutions which conduct laboratory sampling. The automation may use robotics for routine and repetitive fabrication, machining or welding. It may use automation for materials handling and transportation, quality inspection and rejection.

Automation normally requires four components:

- i. actuators (which perform the functions)
- ii. controllers (programmable electronics or computers which control and activate the actuators)
- iii. sensors (which tell the automated system where a unit is, it's various features, and the status of it's fabrication)
- iv. manufacture) and the software and programming to direct the whole system.

Students will demonstrate knowledge of the role of communications systems in process automation by either:

- identifying and explaining the role of communications technology in these types of processes (the lower level of performance);
- by developing a flow chart to design an open automated system to control a simple task (at the medium level of performance), or
- by developing a flow chart to control a miniature automated system (such as a coin sorter or a traffic light which senses vehicles in a traffic lane) at the higher level.

Students will also design a communications system for an automated production, build and test using a package such as Control Lab with logo programming or a Lego Dactal kit.

UNIT 6. Communications for transportation

In this final unit, students will research major technologies and concepts in transportation communications such as : fleet or system control by radio or fax, integrated tracking systems such as for VTM, train systems, or air traffic controller systems; GPS, electronic maps (GIS); verbal communications (cell and satellite phones); ILS (instrument landing systems) or SAR

(search and rescue functions) They will produce a report on descriptions of a list of transportation communications technologies, or an in-depth expose of two of these; or identify trends and project new applications in any communications technology.

Students will also design a communications system for the transport of product to market (e.g. an oil rig) or develop a simulation of a system to solve a transportation problem (such as a major disaster at sea ...oil rig capsized, oil spill, etc.)

4. EVALUATION:

This course has outcomes within which are three levels of difficulty. Student performance can be evaluated through the level to which the specific curriculum outcomes are achieved.

Three levels of performance are specified for each of these 14 specific curriculum outcomes:

- the higher level is required in at least three (3) 20% of the curriculum outcomes;
- the medium level for at least eight (8) 60% of these curriculum outcome
- the lower level of performance is permissible in the remainder of the outcomes.

The criteria for evaluation of student achievement in activity-based technology courses include:

- initiative (independent work and engagement)
- engagement (time on task – the amount of supervision required to maintain this)
- teamwork skills (cooperative work with others in a group activity)
- product (solution of the problem or stages in the progression of the problem)

Evidence of student achievement can be measured by a range of tasks, from such sources as:

- observations
- check lists or rating scales
- interviews
- self evaluation or peer evaluation in the group
- projects
- presentations
- work samples
- portfolios
- journals
- written tests
- research
- peer evaluation

Performance evaluation in this course should reflect the following relative weights.

Categories	Weighting
Knowledge of content / concepts	20%
Problem-solving skills	25%
Research Skills	20%
Production (product)	25%
Knowledge about careers	10%

5. INSTRUCTIONAL STRATEGIES

This course should focus on the development of higher learning skills. Students should develop the ability to reason, to make realistic judgments and develop creative solutions to problems. Students should use decision-making strategies to achieve these solutions and employ the design process for technical problem solving

Recommended teaching / learning strategies include:

- adapting the course to the pace of learning of which the student is capable;
- cooperative learning in small groups in which group success translates into individual success;
- consideration of different learning styles;
- lectures, discussions and group / individual coaching.

6. CLASSROOM ENVIRONMENT

The facility required is a technology lab which is configured in modular workstations, each dedicated to one of the activity-based technology units. (numbered 2,3,4, and 5). There should be two computers at each of these workstations. As there are four of these activity-based units in the curriculum, two (2) workstations for each of these activity-based technology Units (a total of eight workstations, with a total of 16 -24 computers) are required to accommodate 24 students in a class.

The basic logistic requirements for teaching this course include:

- Desks or tables with adequate space to place manuals or interface equipment (3-4 linear feet/workstation)
- Computers on the basis of 1 / student pair at a minimum or ideally 1 per student.
- The computers should minimally have 16mB RAM, 500 mB hard drives and operate as fast (clock speeds) as can be afforded.
- Ideally, two of these units should have 17" monitors or larger for graphics and video.
- Other desirable peripherals include a plotter, a scanner and a colour inkjet printer.
- Each video production station for the course requires one camcorder, one VCR which will accept the tapes from the camera, and one TV or video monitor.
- A video editing suite or a video editing program like Adobe Premiere Video Editor
- If VideoDirector is the video-editing software used, the VCR should have an infrared controller.
- Automated control system like the Lego Dactal kits (minimum 2 required)
- For a class of 24 students in groups of 3, two module stations for each of the Units 2, 3, 4, and 5 are required.

Comprehensive tutorials and curriculum guide materials on this course are available on the Department of Education's website: <http://www.ed.gov.nl.ca/edu/sp/techedu.htm>